

SYSTEMS FOR GENERATING SHORT-PULSE LASER LIGHT  
ABSTRACT OF THE DISCLOSURE

The present invention has the following objectives:

- (1) to realize a compact, high-pulse-energy power and  
5 short-pulse laser using an amplification system that is  
theoretically free from heat generation;
- (2) to perform automatic correction of wave planes by  
generating Raman light in the presence of thermal  
distortion;
- 10 (3) to realize a compact system that can produce shorter  
pulses without using the pulse extender, pulse compressor  
and other devices used in CPA that are bulky and which  
require precise adjustments.

- To attain these objects, the present inventors
- 15 developed the following techniques:
    - a) a system for compressing sub-nanosecond laser pulses by  
the tandem SBS method using the stimulated Brillouin  
scattering effect;
    - b) a system for multi-stage compression of pulses to a  
20 duration as short as the life of phonon (sub-picoseconds)  
using the stimulated Raman scattering effect;
    - c) a method of introducing seed pulses by the half-waist  
reflection method and the tandem crystal method for the  
purpose of reducing the simulated Raman scattering effect;
    - 25 d) a pulse compressing system incorporating the step of  
shortening the pulse duration by the generation of second  
and third harmonics.

No optical data required for the development of these

techniques were available before the accomplishment of the present invention. Hence, the present inventors found by experiment the limit on optical damage and the threshold intensity of the pump laser for the generation of optical  
5 scattering in a laser field that was intense but not so strong as to cause channeling due to self-focusing.

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